AMENDMENTS TO THE CLAIMS

Please cancel all pending claims and replace with the following rewritten claims:

Listing of Claims

17. Device for the detection of at least one ligand contained in a sample that is to be analyzed, with an optical waveguide, on the surface of which several detection fields are located, in which individual receptors are directly or indirectly immobilized which, when it comes into contact with the ligand, forms a specific bond with the ligand, with at least one optical source of radiation for injecting excitation radiation into the waveguide, the radiation being used for exciting the emission of luminescence radiation as a function of the bonding of the ligand to the receptor, and with a semiconductor chip that has at least one radiation receiver on a semiconductor substrate for the individual detection fields to detect the luminescence radiation, characterized by the fact that the waveguide is monolithically integrated with the semiconductor substrate or is located in the form of a waveguide layer on the semiconductor chip, and that the radiation receivers associated with the detection fields are integrated into the semiconductor substrate facing the detection fields directly on the back side of the waveguide facing away from the detection fields.

18. The device as recited in claim 17, characterized by the fact that the topography of the semiconductor chip, to prevent the undesirable extortion of light from the waveguide, is realized so that the boundary surface opposite the at least one receptor between the semiconductor chip and the waveguide runs between two planes that are oriented parallel to the plane of extension of the semiconductor chip, whereby the distance between said two planes is less than the wavelength of the excitation radiation, in particular less than one-half, preferably one-fourth and optionally one-eighth of the wavelength of the excitation radiation.

19. The device as recited in claim 17, characterized by the fact that the semiconductor chip, laterally next to the waveguide, has structures for an electronic circuit.

20. The device as recited in claim 17, characterized by the fact that between the semiconductor chip and the waveguide there is an intermediate layer, the optical index of refraction of which is less than that of the waveguide, that the intermediate layer has the negative shape of the semiconductor chip, to which it is directly adjacent on the semiconductor chip, and that the front side of the intermediate layer that faces away from the semiconductor chip and is directly adjacent to the waveguide is essentially plane.

21. The device as recited in claim 17, characterized by the fact that the intermediate layer is realized in the form of an adhesive coating, preferably in the form of a polymer coating.

22. The device as recited in claim 17, characterized by the fact that the waveguide is connected with the semiconductor chip by means of at least one bonding point.

23. The device as recited in claim 17, characterized by the fact that the waveguide is realized in the form of a thin-film layer that preferably consists of a transparent polymer material, in particular polystyrene.

24. The device as recited in claim 17, characterized by the fact that the waveguide is formed by a metal oxide layer, in particular a silicon dioxide layer or a tantalum pentoxide layer.

25. The device as recited in claim 17, characterized by the fact that the optical radiation source is realized in the form of a semiconductor radiation source and is integrated into the semiconductor chip.

26. The device as recited in claim 17, characterized by the fact that for the injection of the excitation radiation into the waveguide, an optical injection system is provided in the emission area of the optical radiation source, which system is preferably realized in one piece with the waveguide and in particular has at least one prism, an optical lattice and/or a deflecting mirror.

27. The device as recited in claim 17, characterized by the fact that the detection fields are at some distance from one another and are positioned relative to the radiation receivers so that the individual radiation receivers receive essentially no luminescence radiation from a detection field of another radiation receiver.

28. The device as recited in claim 17, characterized by the fact that the at least one receptor is located in the interior cavity of a flow-through measurement chamber that has at least one inlet opening and one outlet opening, and that the semiconductor chip preferably forms a wall area of the flow-through measurement chamber.

29. The device as recited claim 17, characterized by the fact that to control the temperature of the flow-through measurement chamber a heating and/or cooling device is provided, which preferably has a Peltier element.

30. The device as recited in claim 17, characterized by the fact that in the flow-through measurement chamber there is at least one reagent and/or reaction partner for the detection of the bonding of the at least one ligand to the at least one receptor.